

## Photometric Test Report

### Relevant Standards

- ☒ IES LM-79-2008
- ☒ ANSI C82.77-2017

Prepared For

**RAB Lighting Inc.**

Prepared By

**Dongguan New Testing Centre Co., Ltd.**

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Issue Date: 2023-11-15

Revised Date: N/A

## 1.0 Test Summary

DLC Technical Requirements V5.1

Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires				
Requirement Category	Test Method	Requirements		Test Value
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		4470
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-180° zones)	IES LM-79-2008	N/A		134.6
Luminaire Output (lm) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	300		4397
Minimum Luminaire Efficacy (lm/W) (Goniophotometer – Section 4.2) (0°-90° zones)	IES LM-79-2008	Standard	Premium	132.4
		105	120	
Power (Input Wattage) (W) (Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		33.2
Total Harmonic Distortion (A%) (THD & PF – Section 4.3)	ANSI C82.77:2014	20.00%	120V	2.97
			277V	9.36
Power Factor (THD & PF – Section 4.3)	ANSI C82.77:2014	0.9	120V	0.997
			277V	0.940
Allowable CCTs* (K) (Integrating Sphere – Section 4.1)	IES LM-79-2008	7 steps	3045±175	3109
		4 steps	3045±100	
Minimum CRI (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	≥70		81.8
Minimum R9 (Integrating Sphere – Section 4.1)	IES LM-79-2008 CIE13.3-1995	N/A		7
Minimum Rf (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥70		84
Minimum Rg (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	≥89		95
IES Rcs,h1 (Integrating Sphere – Section 4.1)	ANSI/IES TM-30-18	-18%≤IES Rcs,h1≤+23%		-12%
Zonal Lumen Requirement (80°-90°) (Goniophotometer – Section 4.2)	IES LM-79-2008	≤10%		2.1%
Input Voltage (V)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Cast		277.0
(Goniophotometer – Section 4.2)		Non-Worst Case		120.0
Input Current (A)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		0.128
(Goniophotometer – Section 4.2)		Non-Worst Case		0.275
Power (Input Wattage – W)				
(Goniophotometer – Section 4.2)	IES LM-79-2008	Worst Case		33.2
(Goniophotometer – Section 4.2)		Non-Worst Case		32.9

## 2.0 Test List

Test Item	Test	Test Date	Model Number	Sample No.
1	Integrating Sphere Test	2023-11-02	WPX1 @ 25W / 3000K	231101002-S1
2	Goniophotometer Test	2023-11-02	WPX1 @ 25W / 3000K	231101002-S1
3	THD and PF Test	2023-11-02	WPX1 @ 25W / 3000K	231101002-S1

### Remark (If any)

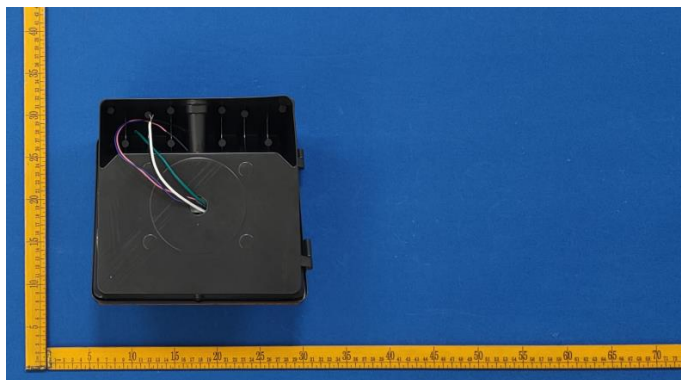
1. The results contained in this report pertain only to the tested samples.
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3. This report does not imply product certification, approval, or endorsement by NVLAP, or any agency of the Federal Government.

## 3.0 Product Description

Luminaire Description: Model No. WPX1 @ 25W / 3000K, color tunable from 3000K, 4000K and 5000K.

Electrical Specification: 120-277Vac, 50/60Hz

Photos of Luminaire Characteristics



## 4.0 LM-79 Measurement and Test Results

### 4.1 Integrating Sphere Test

<b>Model No.</b>	WPX1 @ 25W / 3000K	<b>Sample ID</b>	231101002-S1
<b>Operate time (Min.)</b>	10	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	25.4	<b>Humidity (%RH)</b>	41.0

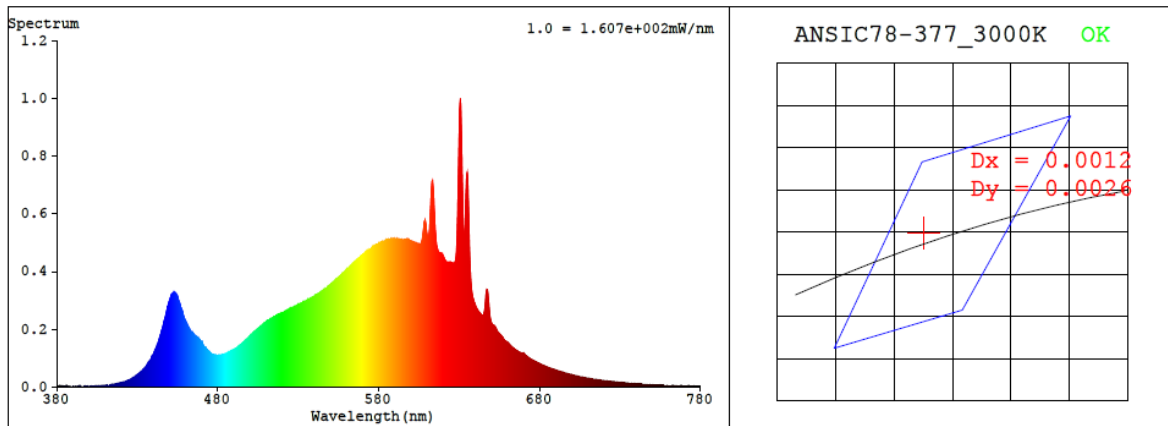
<b>Test Method</b>
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25±1°C.</p> <p>The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load.</p> <p>The sample was measured using 4<math>\pi</math> geometry and operated at rated voltage and was stabilized before measurement.</p> <p>Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780nm.</p>

#### Test Result

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
120.0	60	0.275	32.9	0.997
277.0	60	0.128	33.2	0.940

CCT (K)	CRI	R9	Duv	Rf	Rg	IES Rcs,h1
3109	81.8	7	0.0009	84	95	-12%

## 4.1 Integrating Sphere Test



### Colorimetric Parameters

Chromaticity Coordinate:  $x = 0.4306$   $y = 0.4039$  /  $u' = 0.2465$   $v' = 0.5204$  ( $duv = 8.57e-04$ )

CCT= 3109K Prep WL: Ld=582.1nm Purity=50.5%

Peak WL: Lp=631nm FWHM: =8.2nm Ratio: R=22.1% G=75.3% B=2.6%

Render Index: Ra = 81.8 AvgR = 75.5 TM30: Rf=83 Rg=95

EEI: 0.10217 A++ Highest

R1 =80 R2 =90 R3 =97 R4 =79 R5 =79 R6 =87 R7 =83

R8 =60 R9 =7 R10=76 R11=77 R12=66 R13=82 R14=99 R15=73

## 4.1 Integrating Sphere Test

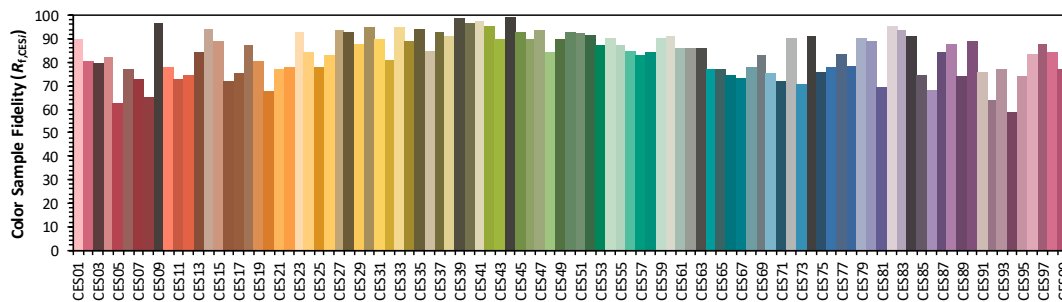
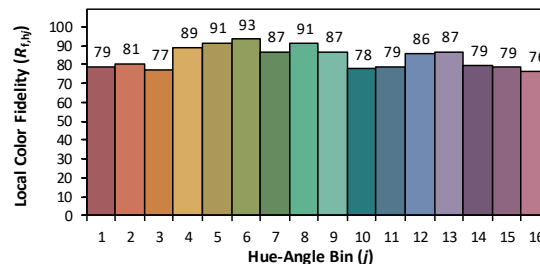
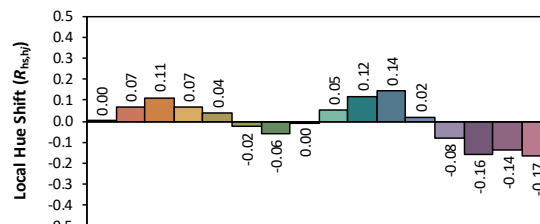
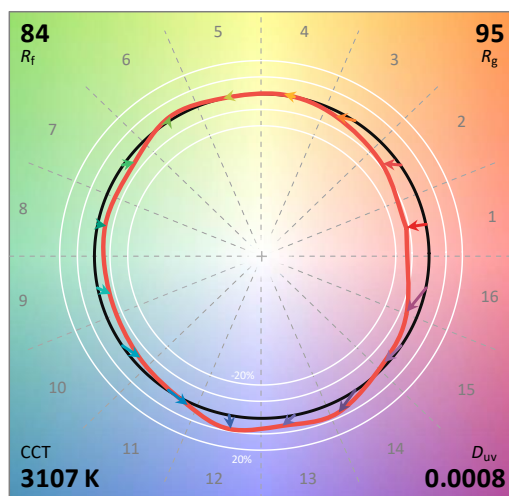
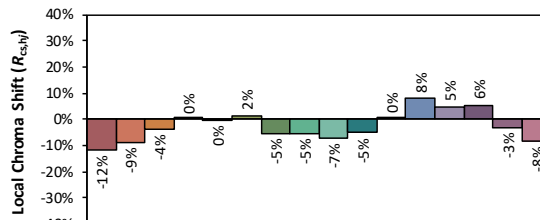
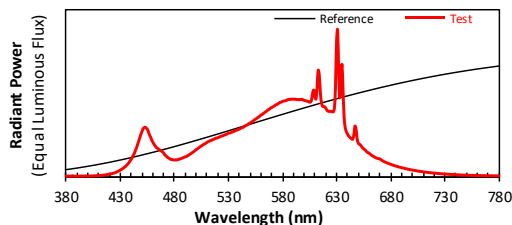
### ANSI/IES TM-30-18 Color Rendition Report

Source: 1 CIE F1

Manufacturer: RAB Lighting Inc.

Date: 2023/11/15

Model: WPX1 @ 25W / 3000K



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

$x$  0.4306  
 $y$  0.4038  
 $u'$  0.2466  
 $v'$  0.5203

CIE 13.3-1995  
(CRI)

$R_a$  82  
 $R_g$  7

## 4.1 Integrating Sphere Test

Spectral Distribution over Visible Wavelength											
WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)	WL (nm)	Radiant (W/nm)
380	1.30E-06	447	2.35E-04	514	2.38E-04	581	5.00E-04	648	3.17E-04	715	2.60E-05
381	1.70E-06	448	2.58E-04	515	2.43E-04	582	5.02E-04	649	2.52E-04	716	2.49E-05
382	2.80E-06	449	2.79E-04	516	2.45E-04	583	5.04E-04	650	2.23E-04	717	2.44E-05
383	2.00E-07	450	2.98E-04	517	2.50E-04	584	5.06E-04	651	2.14E-04	718	2.36E-05
384	2.60E-06	451	3.17E-04	518	2.53E-04	585	5.10E-04	652	2.10E-04	719	2.29E-05
385	1.60E-06	452	3.23E-04	519	2.54E-04	586	5.12E-04	653	2.01E-04	720	2.19E-05
386	4.40E-06	453	3.27E-04	520	2.57E-04	587	5.11E-04	654	1.90E-04	721	2.11E-05
387	1.40E-06	454	3.20E-04	521	2.59E-04	588	5.14E-04	655	1.84E-04	722	2.07E-05
388	1.70E-06	455	3.13E-04	522	2.63E-04	589	5.12E-04	656	1.78E-04	723	1.99E-05
389	1.40E-06	456	2.94E-04	523	2.66E-04	590	5.13E-04	657	1.72E-04	724	1.93E-05
390	2.40E-06	457	2.75E-04	524	2.68E-04	591	5.13E-04	658	1.63E-04	725	1.86E-05
391	9.00E-07	458	2.60E-04	525	2.70E-04	592	5.13E-04	659	1.59E-04	726	1.81E-05
392	1.40E-06	459	2.42E-04	526	2.75E-04	593	5.10E-04	660	1.55E-04	727	1.76E-05
393	2.60E-06	460	2.28E-04	527	2.76E-04	594	5.11E-04	661	1.49E-04	728	1.72E-05
394	2.50E-06	461	2.16E-04	528	2.80E-04	595	5.09E-04	662	1.43E-04	729	1.63E-05
395	1.50E-06	462	2.05E-04	529	2.83E-04	596	5.11E-04	663	1.37E-04	730	1.58E-05
396	1.60E-06	463	1.95E-04	530	2.87E-04	597	5.11E-04	664	1.34E-04	731	1.54E-05
397	3.10E-06	464	1.89E-04	531	2.88E-04	598	5.13E-04	665	1.29E-04	732	1.49E-05
398	3.00E-06	465	1.83E-04	532	2.90E-04	599	5.08E-04	666	1.25E-04	733	1.41E-05
399	2.90E-06	466	1.78E-04	533	2.94E-04	600	5.05E-04	667	1.22E-04	734	1.39E-05
400	2.00E-06	467	1.73E-04	534	2.97E-04	601	5.03E-04	668	1.19E-04	735	1.32E-05
401	2.70E-06	468	1.69E-04	535	2.98E-04	602	5.01E-04	669	1.18E-04	736	1.27E-05
402	2.60E-06	469	1.62E-04	536	3.03E-04	603	5.00E-04	670	1.17E-04	737	1.28E-05
403	2.30E-06	470	1.56E-04	537	3.06E-04	604	4.97E-04	671	1.12E-04	738	1.20E-05
404	3.50E-06	471	1.44E-04	538	3.07E-04	605	4.94E-04	672	1.06E-04	739	1.20E-05
405	3.30E-06	472	1.38E-04	539	3.11E-04	606	4.94E-04	673	1.02E-04	740	1.14E-05
406	4.10E-06	473	1.31E-04	540	3.14E-04	607	5.11E-04	674	9.81E-05	741	1.10E-05
407	4.30E-06	474	1.24E-04	541	3.18E-04	608	5.58E-04	675	9.48E-05	742	1.10E-05
408	4.40E-06	475	1.21E-04	542	3.22E-04	609	5.73E-04	676	9.19E-05	743	1.04E-05
409	5.40E-06	476	1.15E-04	543	3.25E-04	610	5.30E-04	677	8.88E-05	744	1.00E-05
410	5.50E-06	477	1.13E-04	544	3.28E-04	611	5.15E-04	678	8.58E-05	745	9.70E-06
411	5.90E-06	478	1.11E-04	545	3.33E-04	612	5.91E-04	679	8.33E-05	746	9.30E-06
412	6.20E-06	479	1.11E-04	546	3.38E-04	613	7.05E-04	680	8.08E-05	747	8.90E-06
413	7.00E-06	480	1.09E-04	547	3.40E-04	614	6.76E-04	681	7.78E-05	748	8.90E-06
414	8.10E-06	481	1.10E-04	548	3.46E-04	615	5.61E-04	682	7.51E-05	749	8.40E-06
415	9.10E-06	482	1.09E-04	549	3.51E-04	616	4.92E-04	683	7.31E-05	750	8.00E-06
416	9.80E-06	483	1.11E-04	550	3.53E-04	617	4.67E-04	684	7.09E-05	751	8.00E-06
417	1.08E-05	484	1.14E-04	551	3.59E-04	618	4.64E-04	685	6.84E-05	752	7.70E-06
418	1.25E-05	485	1.15E-04	552	3.64E-04	619	4.62E-04	686	6.60E-05	753	7.30E-06
419	1.36E-05	486	1.18E-04	553	3.69E-04	620	4.53E-04	687	6.46E-05	754	7.30E-06
420	1.52E-05	487	1.21E-04	554	3.75E-04	621	4.41E-04	688	6.20E-05	755	7.00E-06
421	1.68E-05	488	1.23E-04	555	3.80E-04	622	4.34E-04	689	6.05E-05	756	6.80E-06
422	1.76E-05	489	1.27E-04	556	3.85E-04	623	4.32E-04	690	5.84E-05	757	6.70E-06
423	2.05E-05	490	1.30E-04	557	3.90E-04	624	4.33E-04	691	5.64E-05	758	6.30E-06
424	2.17E-05	491	1.33E-04	558	3.95E-04	625	4.31E-04	692	5.47E-05	759	6.30E-06
425	2.42E-05	492	1.36E-04	559	4.00E-04	626	4.30E-04	693	5.29E-05	760	5.80E-06
426	2.69E-05	493	1.41E-04	560	4.08E-04	627	4.29E-04	694	5.15E-05	761	5.80E-06
427	3.12E-05	494	1.46E-04	561	4.11E-04	628	4.50E-04	695	4.98E-05	762	5.60E-06
428	3.37E-05	495	1.50E-04	562	4.16E-04	629	5.87E-04	696	4.78E-05	763	5.60E-06
429	3.83E-05	496	1.55E-04	563	4.21E-04	630	8.89E-04	697	4.63E-05	764	5.10E-06
430	4.19E-05	497	1.60E-04	564	4.28E-04	631	9.74E-04	698	4.52E-05	765	5.20E-06
431	4.69E-05	498	1.65E-04	565	4.32E-04	632	7.07E-04	699	4.36E-05	766	4.70E-06
432	5.14E-05	499	1.71E-04	566	4.38E-04	633	5.22E-04	700	4.26E-05	767	4.90E-06
433	5.56E-05	500	1.77E-04	567	4.44E-04	634	6.30E-04	701	4.08E-05	768	4.60E-06
434	6.23E-05	501	1.81E-04	568	4.47E-04	635	7.45E-04	702	3.96E-05	769	4.50E-06
435	6.77E-05	502	1.87E-04	569	4.54E-04	636	5.76E-04	703	3.83E-05	770	4.40E-06
436	7.59E-05	503	1.93E-04	570	4.57E-04	637	3.96E-04	704	3.73E-05	771	4.30E-06
437	8.36E-05	504	1.97E-04	571	4.62E-04	638	3.27E-04	705	3.55E-05	772	4.20E-06
438	9.15E-05	505	2.03E-04	572	4.65E-04	639	2.99E-04	706	3.48E-05	773	4.20E-06
439	1.04E-04	506	2.07E-04	573	4.71E-04	640	2.83E-04	707	3.35E-05	774	4.00E-06
440	1.13E-04	507	2.12E-04	574	4.75E-04	641	2.71E-04	708	3.27E-05	775	3.80E-06
441	1.26E-04	508	2.16E-04	575	4.78E-04	642	2.62E-04	709	3.13E-05	776	3.60E-06
442	1.41E-04	509	2.21E-04	576	4.83E-04	643	2.55E-04	710	3.05E-05	777	3.60E-06
443	1.53E-04	510	2.25E-04	577	4.89E-04	644	2.49E-04	711	2.95E-05	778	3.40E-06
444	1.73E-04	511	2.30E-04	578	4.92E-04	645	2.47E-04	712	2.86E-05	779	3.50E-06
445	1.91E-04	512	2.33E-04	579	4.94E-04	646	2.75E-04	713	2.76E-05	780	3.50E-06
446	2.13E-04	513	2.37E-04	580	4.98E-04	647	3.34E-04	714	2.67E-05	N/A	N/A



## 4.0 LM-79 Measurement and Test Results

### 4.2 Goniophotometer Test

<b>Model No.</b>	WPX1 @ 25W / 3000K	<b>Sample ID</b>	231101002-S1
<b>Operate time (Min.)</b>	30	<b>Stabilization time (Min.)</b>	60
<b>Temperature (°C)</b>	24.8	<b>Humidity (%RH)</b>	42.9

<b>Test Method</b>
<p>The Samples were tested according to the IES LM-79-2008.</p> <p>Photometric parameters were measured using a type C goniophotometer and software.</p> <p>The ambient temperature shall be maintained at <math>25 \pm 1^\circ\text{C}</math>, measured at a point not more than 1 m from the sample and at the same height as the sample.</p> <p>The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within <math>\pm 0.2</math> percent under load.</p> <p>The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at <math>1.0^\circ</math> vertical intervals and <math>15^\circ</math> horizontal intervals.</p>

#### Test Conditions

Condition	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor
<b>WORST CASE</b>	277.0	60	0.128	33.2	0.940
<b>NON-WORST CASE</b>	120.0	60	0.275	32.9	0.997

#### Test Result

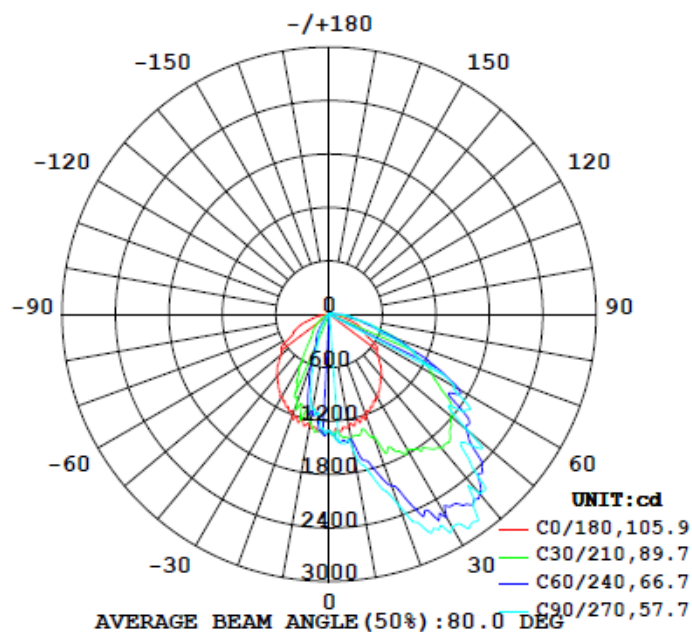
Result Type	Flux (lm)	Field Angle (10%)		Beam Angle (50%)		Luminous Efficacy (lm/W)	Zonal Lumen Requirement (80°-90°)	BUG
		C0-180	C90-270	C0-180	C90-270			
<b>0°-180° zones</b>	4470	108.9	146.8	56.0	97.4	134.6	2.0%	B1-U2-G1
<b>0°-90° zones</b>	4397	108.9	146.8	56.0	97.4	132.4	2.1%	B1-U2-G1



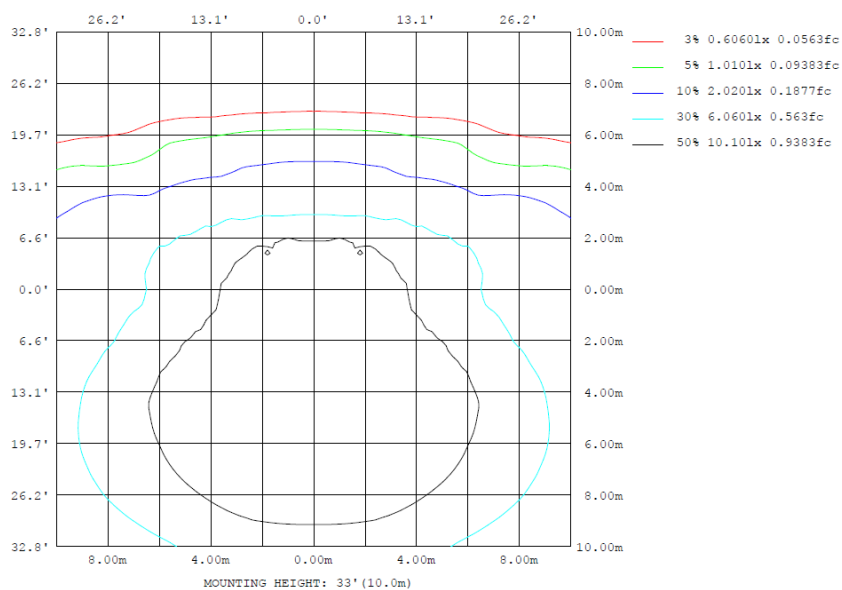
## 4.2 Goniophotometer Test

### Lighting Distribution Curve

LUMINOUS INTENSITY DISTRIBUTION DIAGRAM



### Isolux Plot



## 4.2 Goniophotometer Test

### Zonal Lumen Summary

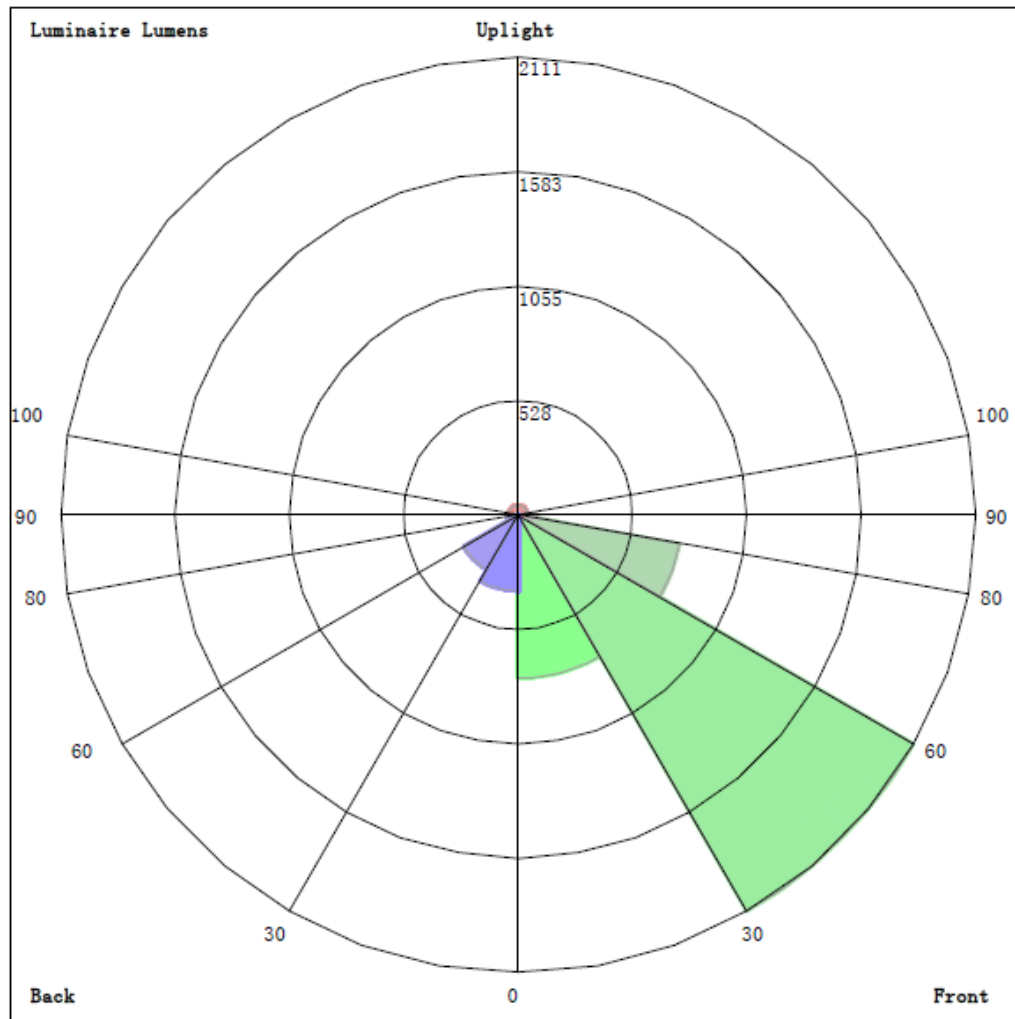
ZONAL FLUX DIAGRAM:

γ	C0	C45	C90	C135	C180	C225	C270	C315	γ	zone	total	lum, lamp
10	1277	1442	1543	1442	1277	1141	1083	1141	0- 10	126.1	126.1	2.82, 2.82
20	1217	1784	2288	1784	1217	791.1	413.0	791.1	10- 20	369.2	495.4	11.1, 11.1
30	1068	2321	2763	2321	1068	338.7	206.5	338.7	20- 30	607.7	1103	24.7, 24.7
40	912.8	2294	2624	2294	912.8	189.9	60.82	189.9	30- 40	794.4	1897	42.4, 42.4
50	702.2	2043	2030	2043	702.2	64.64	27.79	64.64	40- 50	849.1	2747	61.4, 61.4
60	492.0	1452	1629	1452	492.0	24.50	0.5506	24.50	50- 60	757.8	3504	78.4, 78.4
70	328.5	843.1	675.4	843.1	328.5	4.365	0.7992	4.365	60- 70	547.3	4052	90.6, 90.6
80	111.7	283.3	290.3	283.3	111.7	1.910	0.8182	1.910	70- 80	254.4	4306	96.3, 96.3
90	14.90	106.7	96.92	106.7	14.90	1.250	0.9806	1.250	80- 90	91.40	4397	98.4, 98.4
100	10.45	34.20	51.29	34.20	10.45	1.347	1.350	1.347	90-100	28.51	4426	99, 99
110	9.793	10.97	39.31	10.97	9.793	1.219	1.409	1.219	100-110	13.44	4439	99.3, 99.3
120	7.813	26.79	14.60	26.79	7.813	1.171	1.493	1.171	110-120	9.517	4449	99.5, 99.5
130	3.223	21.67	23.67	21.67	3.223	1.268	1.795	1.268	120-130	9.952	4459	99.7, 99.7
140	0.8116	13.20	18.94	13.20	0.8116	1.405	1.870	1.405	130-140	6.657	4465	99.9, 99.9
150	0.7503	6.365	8.978	6.365	0.7503	1.581	1.823	1.581	140-150	3.344	4469	100, 100
160	0.8875	0.7053	3.045	0.7053	0.8875	1.682	1.623	1.682	150-160	1.122	4470	100, 100
170	1.075	1.040	0.8489	1.040	1.075	1.410	1.235	1.410	160-170	0.3716	4470	100, 100
180	1.241	1.195	1.008	1.195	1.241	1.146	1.073	1.146	170-180	0.1144	4470	100, 100
DEG	LUMINOUS INTENSITY:cd									UNIT:lm		

	Zonal (lm)		Total (lm)	Percent
0-10	126.14	0-10	126.14	2.82%
10-20	369.23	0-20	495.37	11.08%
20-30	607.70	0-30	1103.07	24.68%
30-40	794.38	0-40	1897.45	42.45%
40-50	849.05	0-50	2746.50	61.44%
50-60	757.79	0-60	3504.29	78.39%
60-70	547.29	0-70	4051.58	90.63%
70-80	254.41	0-80	4305.99	96.32%
80-90	91.40	0-90	4397.39	98.37%
90-100	28.51	0-100	4425.90	99.01%
100-110	13.44	0-110	4439.34	99.31%
110-120	9.52	0-120	4448.86	99.52%
120-130	9.95	0-130	4458.81	99.74%
130-140	6.66	0-140	4465.47	99.89%
140-150	3.34	0-150	4468.81	99.97%
150-160	1.12	0-160	4469.93	99.99%
160-170	0.37	0-170	4470.30	100.00%
170-180	0.11	0-180	4470.41	100.00%

## 4.2 Goniophotometer Test

LCS/BUG

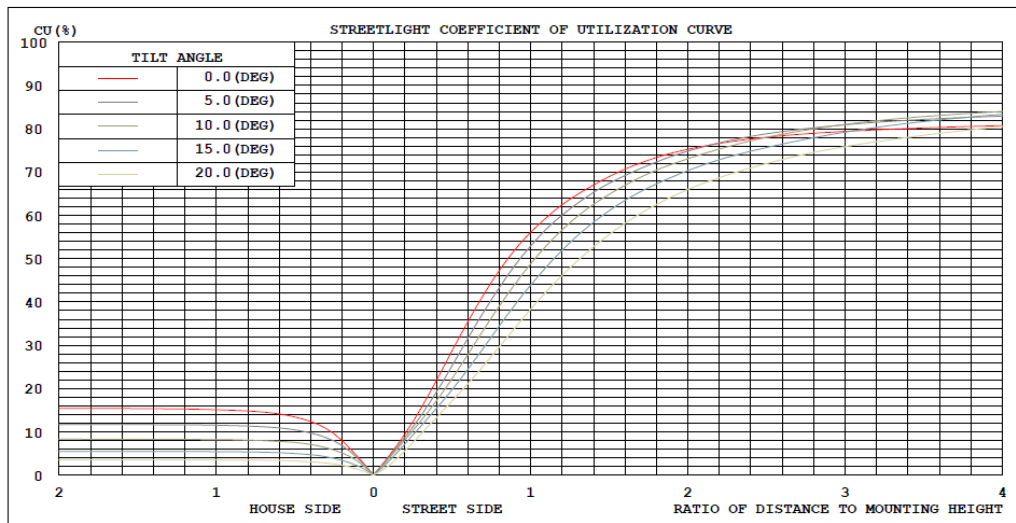


### LUMINAIRE CLASSIFICATION SYSTEM (LCS)

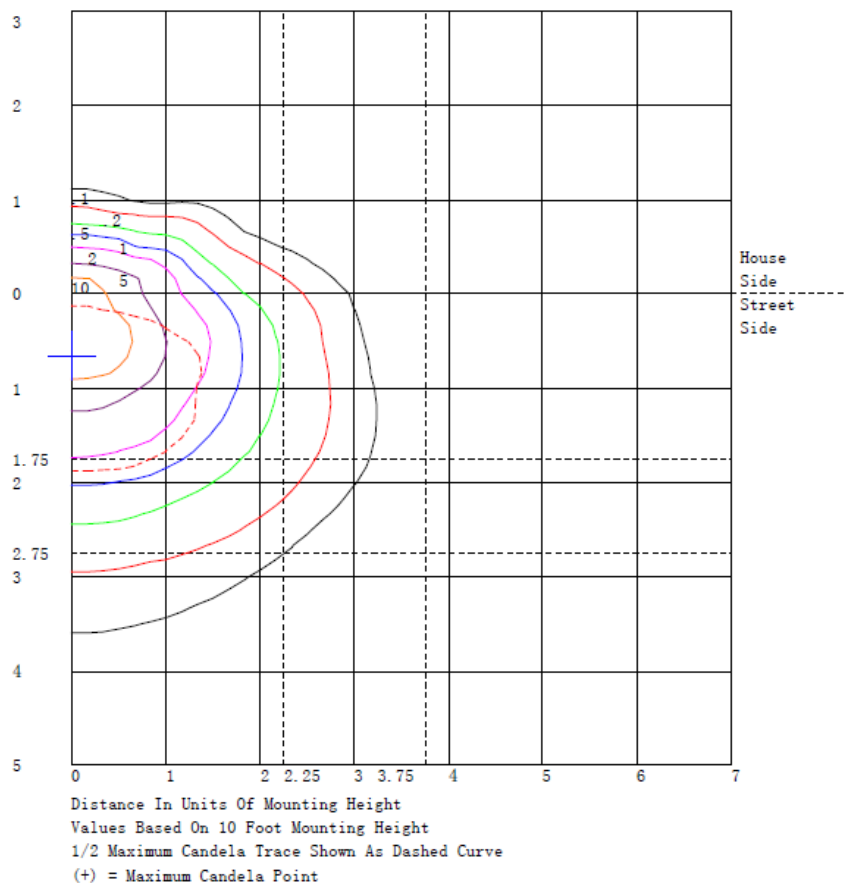
	Lumens	% Lamp	% Luminaire
FL - Front-Low (0-30)	753.0	N.A.	16.8
FM - Front-Medium (30-60)	2110.9	N.A.	47.2
FH - Front-High (60-80)	755.0	N.A.	16.9
FVH - Front-Very High (80-90)	87.1	N.A.	1.9
BL - Back-Low (0-30)	350.1	N.A.	7.8
BM - Back-Medium (30-60)	290.4	N.A.	6.5
BH - Back-High (60-80)	46.7	N.A.	1.0
BVH - Back-Very High (80-90)	4.3	N.A.	0.1
UL - Uplight-Low (90-100)	28.5	N.A.	0.6
UH - Uplight-High (100-180)	44.5	N.A.	1.0
Total	4470.4	N.A.	100.0
BUG Rating	B1-U2-G1		

## 4.2 Goniophotometer Test

### Coefficients of Utilization



### Isolines



## 4.2 Goniophotometer Test

### Luminous Distribution Intensity Data

Table--1

UNIT: cd

C (DEG) y (DEG)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
0	1301	1303	1303	1304	1304	1305	1305	1305	1305	1306	1306	1306	1306	1306	1306	1307	1307	1307	1307
5	1313	1326	1335	1343	1345	1347	1351	1367	1385	1405	1423	1439	1451	1451	1448	1444	1444	1446	1449
10	1277	1290	1307	1329	1362	1396	1425	1437	1442	1442	1433	1426	1426	1450	1481	1511	1527	1538	1543
15	1218	1260	1295	1325	1341	1357	1381	1436	1499	1564	1620	1672	1721	1772	1817	1854	1878	1892	1893
20	1217	1247	1282	1320	1356	1401	1460	1560	1670	1784	1880	1969	2051	2128	2195	2247	2274	2287	2288
25	1151	1145	1176	1242	1363	1506	1658	1779	1900	2028	2198	2363	2508	2584	2632	2660	2689	2706	2712
30	1068	1082	1135	1228	1376	1552	1746	1947	2142	2321	2450	2553	2634	2699	2746	2774	2780	2774	2763
35	1002	1069	1165	1289	1456	1641	1830	2005	2169	2318	2435	2535	2621	2705	2776	2828	2847	2850	2840
40	913	1010	1139	1299	1521	1752	1968	2097	2201	2294	2427	2545	2633	2623	2587	2548	2571	2600	2624
45	824	930	1066	1233	1463	1700	1921	2061	2168	2250	2335	2395	2423	2379	2311	2234	2172	2124	2098
50	702	836	989	1162	1383	1603	1799	1918	1998	2043	2037	2019	2010	2086	2166	2224	2167	2093	2030
55	661	838	1008	1171	1342	1496	1620	1673	1697	1704	1714	1722	1733	1765	1799	1831	1852	1865	1869
60	492	689	863	1015	1144	1250	1334	1380	1416	1452	1538	1620	1684	1671	1639	1603	1608	1619	1629
65	420	571	704	820	916	996	1064	1128	1179	1217	1236	1239	1226	1189	1144	1099	1075	1059	1053
70	329	391	461	539	639	736	816	845	852	843	830	810	788	770	752	733	711	691	675
75	206	255	304	354	416	470	510	506	488	466	459	456	458	467	479	491	498	503	504
80	112	146	177	203	227	246	261	272	279	283	282	280	277	277	279	281	285	288	290
85	40.6	56.3	72.1	87.9	104	120	135	147	158	169	181	192	202	209	215	219	224	228	229
90	14.9	21.6	30.0	40.3	53.9	68.2	81.8	92.6	101	107	107	105	102	100	98.8	97.7	97.3	97.1	96.9
95	11.1	17.2	23.3	29.5	36.5	42.8	47.9	49.2	49.3	48.8	48.9	49.4	50.4	53.1	56.1	59.0	61.2	62.7	63.3
100	10.4	11.2	12.0	12.8	13.0	13.7	15.7	21.5	28.0	34.2	37.1	39.1	40.7	43.5	46.2	48.6	50.1	51.0	51.3
105	1.85	5.28	8.07	10.2	11.2	12.0	12.7	14.3	16.1	18.3	20.7	23.2	25.7	27.9	30.0	32.0	34.2	35.9	36.9
110	9.79	8.49	8.55	9.99	14.6	19.2	22.5	18.7	14.1	11.0	16.0	22.8	29.8	33.0	35.1	36.5	37.9	38.9	39.3
115	8.79	7.00	6.71	7.92	11.7	16.2	20.6	23.3	24.6	24.4	20.1	15.0	10.4	9.36	9.52	10.5	11.8	13.2	14.2
120	7.81	5.95	5.48	6.39	9.39	13.2	17.4	20.8	24.0	26.8	29.6	31.7	32.5	30.6	27.7	24.1	19.6	16.1	14.6
125	5.75	4.38	4.14	5.02	7.47	10.7	14.4	17.9	21.5	24.8	28.0	30.6	32.7	33.9	34.3	33.7	30.3	26.9	24.7
130	3.22	2.48	2.59	3.57	5.69	8.45	11.6	14.9	18.3	21.7	25.2	28.2	30.6	31.5	31.5	30.7	28.0	25.3	23.7
135	1.05	0.00	0.00	0.54	2.97	6.08	9.50	12.3	15.1	18.0	21.5	24.6	27.1	27.8	27.6	26.7	24.9	23.3	22.3
140	0.81	2.06	3.26	4.40	5.36	6.37	7.55	9.16	11.0	13.2	16.1	18.9	21.2	22.0	22.1	21.7	20.6	19.6	18.9
145	0.76	1.40	2.09	2.84	3.60	4.44	5.41	6.56	7.86	9.32	11.3	13.1	14.6	15.0	15.0	14.7	14.2	13.8	13.5
150	0.75	1.19	1.44	1.50	0.96	0.54	0.56	2.24	4.30	6.36	7.52	8.35	8.89	9.14	9.20	9.15	9.07	8.99	8.98
155	0.80	0.80	0.81	0.84	0.77	0.80	1.01	1.78	2.67	3.56	4.12	4.55	4.87	5.04	5.13	5.17	5.25	5.32	5.38
160	0.89	0.88	0.87	0.86	0.84	0.82	0.79	0.69	0.64	0.71	1.15	1.68	2.21	2.51	2.73	2.88	2.96	3.01	3.04
165	0.97	0.98	0.99	0.98	0.96	0.94	0.92	0.88	0.86	0.86	0.92	0.99	1.03	0.97	0.89	0.81	0.77	0.75	0.75
170	1.07	1.09	1.10	1.11	1.11	1.10	1.09	1.08	1.06	1.04	1.03	1.01	1.00	0.99	0.97	0.95	0.91	0.87	0.85
175	1.16	1.16	1.17	1.17	1.17	1.17	1.17	1.17	1.16	1.16	1.15	1.14	1.12	1.07	1.01	0.96	0.94	0.92	0.92
180	1.24	1.25	1.25	1.25	1.25	1.24	1.23	1.22	1.21	1.20	1.18	1.15	1.13	1.11	1.10	1.08	1.05	1.02	1.01

C (DEG)																UNIT: cd			
y (DEG)	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185
0	1307	1307	1307	1306	1306	1306	1306	1306	1306	1305	1305	1305	1305	1304	1304	1303	1303	1301	1303
5	1446	1444	1444	1448	1451	1451	1439	1423	1405	1385	1367	1351	1347	1345	1343	1335	1326	1313	1326
10	1538	1527	1511	1481	1450	1426	1426	1433	1442	1442	1437	1425	1396	1362	1329	1307	1290	1277	1308
15	1892	1878	1854	1817	1772	1721	1672	1620	1564	1499	1436	1381	1357	1341	1325	1295	1260	1218	1220
20	2287	2274	2247	2195	2128	2051	1969	1880	1784	1670	1560	1460	1401	1356	1320	1282	1247	1217	1210
25	2706	2689	2660	2632	2584	2508	2363	2198	2028	1900	1779	1658	1506	1363	1242	1176	1145	1151	1118
30	2774	2780	2774	2746	2699	2634	2553	2450	2321	2142	1947	1746	1552	1376	1228	1135	1082	1068	1089
35	2850	2847	2828	2776	2705	2621	2535	2435	2318	2169	2005	1830	1641	1456	1289	1165	1069	1002	1028
40	2600	2571	2548	2587	2623	2633	2545	2427	2294	2201	2097	1968	1752	1521	1299	1139	1010	913	950
45	2124	2172	2234	2311	2379	2423	2395	2335	2250	2168	2061	1921	1700	1463	1233	1066	930	824	788
50	2093	2167	2224	2166	2086	2010	2019	2037	2043	1998	1918	1799	1603	1383	1162	989	836	702	624
55	1865	1852	1831	1799	1765	1733	1722	1714	1704	1697	1673	1620	1496	1342	1171	1008	838	661	515
60	1619	1608	1603	1639	1671	1684	1620	1538	1452	1416	1380	1334	1250	1144	1015	863	689	492	363
65	1059	1075	1099	1144	1189	1226	1239	1236	1217	1179	1128	1064	996	916	820	704	571	420	299
70	691	711	733	752	770	788	810	830	843	852	845	816	736	639	539	461	391	329	232
75	503	498	491	479	467	458	456	459	466	488	506	510	470	416	354	304	255	206	145
80	288	285	281	279	277	277	280	282	283	279	272	261	246	227	203	177	146	112	77.8
85	228	224	219	215	209	202	192	181	169	158	147	135	120	104	87.9	72.1	56.3	40.6	30.4
90	97.1	97.3	97.7	98.8	100	102	105	107	107	101	92.6	81.8	68.2	53.9	40.3	30.0	21.6	14.9	12.3
95	62.7	61.2	59.0	56.1	53.1	50.4	49.4	48.9	48.8	49.3	49.2	47.9	42.8	36.5	29.5	23.3	17.2	11.1	8.99
100	51.0	50.1	48.6	46.2	43.5	40.7	39.1	37.1	34.2	28.0	21.5	15.7	13.7	13.0	12.8	12.0	11.2	10.4	8.13
105	35.9	34.2	32.0	30.0	27.9	25.7	23.2	20.7	18.3	16.1	14.3	12.7	12.0	11.2	10.2	8.07	5.28	1.85	1.49
110	38.9	37.9	36.5	35.1	33.0	29.8	22.8	16.0	11.0	14.1	18.7	22.5	19.2	14.6	9.99	8.55	8.49	9.79	6.18
115	13.2	11.8	10.5	9.52	9.36	10.4	15.0	20.1	24.4	24.6	23.3	20.6	16.2	11.7	7.92	6.71	7.00	8.79	5.59
120	16.1	19.6	24.1	27.7	30.6	32.5	31.7	29.6	26.8	24.0	20.8	17.4	13.2	9.39	6.39	5.48	5.95	7.81	5.08
125	26.9	30.3	33.7	34.3	33.9	32.7	30.6	28.0	24.8	21.5	17.9	14.4	10.7	7.47	5.02	4.14	4.38	5.75	3.98
130	25.3	28.0	30.7	31.5	31.5	30.6	28.2	25.2	21.7	18.3	14.9	11.6	8.45	5.69	3.57	2.59	2.48	3.22	2.47
135	23.3	24.9	26.7	27.6	27.8	27.1	24.6	21.5	18.0	15.1	12.3	9.50	6.08	2.97	0.54	0.00	0.00	1.05	1.24
140	19.6	20.6	21.7	22.1	22.0	21.2	18.9	16.1	13.2	11.0	9.16	7.55	6.37	5.36	4.40	3.26	2.06	0.81	0.13
145	13.8	14.2	14.7	15.0	15.0	14.6	13.1	11.3	9.32	7.86	6.56	5.41	4.44	3.60	2.84	2.09	1.40	0.76	1.00
150	8.99	9.07	9.15	9.20	9.14	8.89	8.35	7.52	6.36	4.30	2.24	0.56	0.84	0.96	1.50	1.44	1.19	0.75	1.03
155	5.32	5.25	5.17	5.13	5.04	4.87	4.55	4.12	3.56	2.67	1.78	1.01	0.80	0.77	0.84	0.81	0.80	0.80	1.14
160	3.01	2.96	2.88	2.73	2.51	2.21	1.68	1.15	0.71	0.64	0.69	0.79	0.82	0.84	0.86	0.87	0.88	0.89	1.27
165	0.75	0.77	0.81	0.89	0.97	1.03	1.09	0.92	0.86	0.86	0.88	0.92	0.94	0.96	0.98	0.99	0.98	0.97	1.36
170	0.87	0.91	0.95	0.97	0.99	1.00	1.01	1.03	1.04	1.06	1.08	1.09	1.10	1.11	1.11	1.10	1.09	1.07	1.36
175	0.92	0.94	0.96	1.01	1.07	1.12	1.14	1.15	1.16	1.16	1.17	1.17	1.17	1.17	1.17	1.17	1.16	1.16	1.34
180	1.02	1.05	1.08	1.10	1.11	1.13	1.15	1.18	1.20	1.21	1.22	1.23	1.24	1.25	1.25	1.25	1.25	1.24	1.31



Table--3

UNIT: °C

C (DEG)	190	195	200	205	210	215	220	225	230	235	240	245	250	255	260	265	270	275	280
y (DEG)	0	1304	1304	1305	1305	1305	1305	1306	1306	1306	1306	1306	1306	1305	1306	1306	1307	1306	1306
5	1333	1336	1333	1327	1316	1297	1279	1267	1281	1299	1313	1306	1292	1275	1256	1240	1230	1240	1256
10	1323	1322	1297	1263	1224	1193	1165	1141	1123	1110	1100	1095	1092	1091	1087	1084	1083	1084	1087
15	1222	1224	1237	1244	1236	1186	1123	1056	1007	961	918	870	828	794	780	775	776	775	780
20	1196	1175	1154	1122	1074	987	889	791	718	655	599	548	504	469	440	421	413	421	440
25	1078	1030	975	910	835	736	633	534	459	397	351	329	319	316	309	305	302	305	309
30	1073	1020	909	776	637	521	419	339	303	286	278	258	241	226	216	209	207	209	216
35	1006	935	777	599	431	355	307	276	237	204	176	152	132	117	109	104	104	104	109
40	931	857	681	484	301	236	204	190	152	117	88.8	74.0	65.7	62.1	60.1	59.9	60.8	59.9	60.1
45	728	644	514	378	252	185	140	111	83.6	64.8	52.8	47.3	45.7	46.3	44.8	43.7	43.0	43.7	44.8
50	543	459	366	276	195	139	95.4	64.6	46.9	37.5	33.7	30.0	28.4	28.2	27.8	27.7	27.8	27.7	27.8
55	392	293	226	177	139	99.2	65.8	40.2	27.6	21.4	19.4	17.0	16.0	15.9	15.6	15.5	15.6	15.5	15.6
60	259	180	136	109	91.8	65.6	42.8	24.5	15.0	9.65	7.02	4.19	2.42	1.44	0.80	0.55	0.55	0.55	0.80
65	202	128	87.6	64.3	51.6	34.2	20.7	10.7	4.97	1.87	0.67	0.12	0.31	0.85	0.81	0.74	0.65	0.74	0.81
70	154	94.9	61.7	42.4	32.1	19.5	10.4	4.36	1.48	0.51	0.72	0.56	0.67	0.90	0.90	0.86	0.80	0.86	0.90
75	95.8	58.6	37.5	25.4	19.0	11.4	6.14	2.78	1.12	0.60	0.77	0.70	0.79	0.93	0.91	0.87	0.81	0.87	0.91
80	50.7	30.4	19.3	13.2	10.2	6.35	3.64	1.91	1.05	0.76	0.82	0.77	0.81	0.87	0.87	0.85	0.82	0.85	0.87
85	21.9	15.3	11.0	8.00	5.97	3.96	2.45	1.41	0.94	0.78	0.81	0.79	0.81	0.86	0.87	0.87	0.86	0.87	0.87
90	10.1	8.11	6.54	5.22	4.08	2.94	1.98	1.25	0.97	0.89	0.93	0.90	0.91	0.93	0.94	0.96	0.98	0.96	0.94
95	7.18	5.70	4.67	3.89	3.25	2.48	1.82	1.30	1.10	1.04	1.06	1.03	1.03	1.04	1.05	1.09	1.13	1.09	1.05
100	6.22	4.71	3.77	3.12	2.66	2.12	1.68	1.35	1.22	1.20	1.22	1.21	1.21	1.23	1.25	1.29	1.35	1.29	1.25
105	1.22	1.06	1.02	1.06	1.13	1.19	1.24	1.29	1.30	1.29	1.29	1.30	1.32	1.35	1.38	1.42	1.45	1.42	1.38
110	3.48	1.69	1.23	1.35	1.74	1.57	1.38	1.22	1.21	1.25	1.31	1.34	1.36	1.38	1.39	1.40	1.41	1.40	1.39
115	3.19	1.56	1.06	1.08	1.37	1.29	1.22	1.17	1.20	1.25	1.30	1.33	1.34	1.36	1.39	1.41	1.43	1.41	1.39
120	2.99	1.55	1.03	0.96	1.14	1.12	1.13	1.17	1.22	1.27	1.33	1.36	1.39	1.42	1.45	1.48	1.49	1.48	1.45
125	2.60	1.62	1.19	1.04	1.08	1.07	1.12	1.20	1.28	1.36	1.44	1.48	1.51	1.54	1.58	1.61	1.63	1.61	1.58
130	1.88	1.44	1.22	1.12	1.11	1.13	1.19	1.27	1.34	1.41	1.48	1.56	1.63	1.69	1.74	1.78	1.79	1.78	1.74
135	1.36	1.41	1.35	1.26	1.18	1.20	1.26	1.33	1.41	1.49	1.57	1.64	1.70	1.75	1.79	1.82	1.84	1.82	1.79
140	1.19	1.29	1.31	1.29	1.26	1.30	1.35	1.41	1.46	1.52	1.58	1.65	1.72	1.78	1.82	1.85	1.87	1.85	1.82
145	1.18	1.31	1.35	1.37	1.36	1.40	1.44	1.49	1.55	1.62	1.68	1.72	1.77	1.80	1.83	1.86	1.88	1.86	1.83
150	1.24	1.39	1.44	1.46	1.46	1.50	1.54	1.58	1.62	1.65	1.68	1.71	1.73	1.76	1.78	1.81	1.82	1.81	1.78
155	1.40	1.57	1.64	1.65	1.63	1.61	1.58	1.57	1.59	1.63	1.67	1.70	1.72	1.74	1.73	1.72	1.71	1.72	1.73
160	1.55	1.75	1.82	1.82	1.78	1.75	1.72	1.68	1.67	1.66	1.65	1.61	1.58	1.55	1.57	1.60	1.62	1.60	1.57
165	1.64	1.83	1.87	1.84	1.78	1.75	1.73	1.70	1.67	1.64	1.60	1.52	1.44	1.38	1.39	1.41	1.45	1.41	1.39
170	1.56	1.69	1.72	1.70	1.63	1.56	1.48	1.41	1.38	1.37	1.35	1.30	1.24	1.20	1.20	1.21	1.23	1.21	1.20
175	1.46	1.54	1.56	1.54	1.49	1.42	1.33	1.25	1.22	1.19	1.17	1.13	1.10	1.08	1.10	1.13	1.16	1.13	1.10
180	1.22	1.21	1.21	1.21	1.20	1.19	1.17	1.15	1.12	1.09	1.07	1.04	1.03	1.02	1.03	1.05	1.07	1.05	1.03

C (DEG)	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355				
y (DEG)	0	1305	1306	1306	1306	1306	1306	1306	1305	1305	1305	1305	1305	1304	1304	1303			
5	1275	1292	1306	1313	1299	1281	1267	1279	1297	1316	1327	1333	1336	1333	1332	1326			
10	1091	1092	1095	1100	1110	1123	1141	1165	1193	1224	1263	1297	1322	1323	1308				
15	794	828	870	918	961	1007	1056	1123	1186	1236	1244	1237	1224	1222	1220				
20	469	504	548	599	655	718	791	889	987	1074	1122	1154	1175	1196	1210				
25	316	319	329	351	397	459	534	633	736	835	910	975	1030	1078	1118				
30	226	241	258	278	286	303	339	419	521	637	776	909	1020	1073	1089				
35	117	132	152	176	204	237	276	307	355	431	599	777	935	1006	1028				
40	62.1	65.7	74.0	88.8	117	152	190	204	236	301	484	681	857	931	950				
45	46.3	45.7	47.3	52.8	64.8	83.6	111	140	185	252	378	514	644	728	788				
50	28.2	28.4	30.0	33.7	37.5	46.9	64.6	95.4	139	195	276	366	459	543	624				
55	15.9	16.0	17.0	19.4	21.4	27.6	40.2	65.8	99.2	139	177	226	293	392	515				
60	1.44	2.42	4.19	7.02	9.65	15.0	24.5	42.8	65.6	91.8	109	136	180	259	363				
65	0.85	0.31	0.12	0.67	1.87	4.97	10.7	20.7	34.2	51.6	64.3	87.6	128	202	299				
70	0.90	0.67	0.56	0.72	0.51	1.48	4.36	10.4	19.5	32.1	42.4	61.7	94.9	154	232				
75	0.93	0.79	0.70	0.77	0.60	1.12	2.78	6.14	11.4	19.0	25.4	37.5	58.6	95.8	145				
80	0.87	0.81	0.77	0.82	0.76	1.05	1.91	3.64	6.35	10.2	13.2	19.3	30.4	50.7	77.8				
85	0.86	0.81	0.79	0.81	0.78	0.94	1.41	2.45	3.96	5.97	8.00	11.0	15.3	21.9	30.4				
90	0.93	0.91	0.90	0.93	0.89	0.97	1.25	1.98	2.94	4.08	5.22	6.54	8.11	10.1	12.3				
95	1.04	1.03	1.03	1.06	1.04	1.10	1.30	1.82	2.48	3.25	3.89	4.67	5.70	7.18	8.99				
100	1.23	1.21	1.21	1.22	1.20	1.22	1.35	1.68	2.12	2.66	3.12	3.77	4.71	6.22	8.13				
105	1.35	1.32	1.30	1.29	1.29	1.30	1.29	1.24	1.19	1.13	1.06	1.02	1.06	1.22	1.49				
110	1.38	1.36	1.34	1.31	1.25	1.21	1.22	1.38	1.57	1.74	1.35	1.23	1.69	3.48	6.18				
115	1.36	1.34	1.33	1.30	1.25	1.20	1.17	1.22	1.29	1.37	1.08	1.06	1.56	3.19	5.59				
120	1.42	1.39	1.36	1.33	1.27	1.22	1.17	1.13	1.12	1.14	0.96	1.03	1.55	2.99	5.08				
125	1.54	1.51	1.48	1.44	1.36	1.28	1.20	1.12	1.07	1.08	1.04	1.19	1.62	2.60	3.98				
130	1.69	1.63	1.56	1.48	1.41	1.34	1.27	1.19	1.13	1.11	1.12	1.22	1.44	1.88	2.47				
135	1.75	1.70	1.64	1.57	1.49	1.41	1.33	1.26	1.20	1.18	1.26	1.35	1.41	1.36	1.24				
140	1.78	1.72	1.65	1.58	1.52	1.46	1.41	1.35	1.30	1.26	1.29	1.31	1.29	1.19	1.03				
145	1.80	1.77	1.72	1.68	1.62	1.55	1.49	1.44	1.40	1.36	1.37	1.35	1.31	1.18	1.00				
150	1.76	1.73	1.71	1.68	1.65	1.62	1.58	1.54	1.50	1.46	1.46	1.44	1.39	1.24	1.03				
155	1.74	1.72	1.70	1.67	1.63	1.59	1.57	1.58	1.61	1.63	1.65	1.64	1.67	1.40	1.14				
160	1.55	1.58	1.61	1.65	1.66	1.67	1.68	1.72	1.75	1.78	1.82	1.82	1.75	1.55	1.27				
165	1.38	1.44	1.52	1.60	1.64	1.67	1.70	1.73	1.75	1.78	1.84	1.87	1.83	1.64	1.36				
170	1.20	1.24	1.30	1.35	1.37	1.38	1.41	1.48	1.56	1.63	1.70	1.72	1.69	1.56	1.36				
175	1.08	1.10	1.13	1.17	1.19	1.22	1.25	1.33	1.42	1.49	1.54	1.56	1.54	1.46	1.34				
180	0.92	1.03	1.04	1.07	1.09	1.12	1.15	1.17	1.19	1.20	1.21	1.21	1.21	1.21	1.23				

## 4.0 LM-79 Measurement and Test Results

### 4.3 THD and PF Test

<b>Model No.</b>	WPX1 @ 25W / 3000K	<b>Sample ID</b>	231101002-S1
<b>Temperature (°C)</b>	25.4	<b>Humidity (%RH)</b>	41.0

<b>Test Method</b>
<p>The samples were tested according to the ANSI C82.77:2014</p> <p>The total harmonic distortion shall be measured to the 40th order.</p> <p>The ambient temperature shall be maintained at <math>25 \pm 1^{\circ}\text{C}</math>. The sample measurements were made using a digital power meter and power supply. The sample was operated at rated voltage and was stabilized before measurement. The total harmonic distortion was calculated.</p>

### Test Results

Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	iTHD(%)
120.0	60	0.275	32.9	0.997	2.97
277.0	60	0.128	33.2	0.940	9.36



## 5.0 Equipment List:

Equipment ID	Equipment Name	Last Cal.	Due Cal.
NTC-F01-001	Goniophotometer System	2022-11-09	2023-11-08
NTC-F01-006	2.0 meter Integrating Sphere	2022-11-09	2023-11-08
NTC-F01-012	Standard Lamp	2022-11-09	2023-11-08
NTC-F01-013	Standard Lamp	2022-11-09	2023-11-08
NTC-F01-031	Digital Power Meter	2023-08-25	2024-08-24
NTC-F01-019	Temperature & Humidity Meter	2022-11-12	2023-11-11

\*\*\*\*\*End of Report\*\*\*\*\*